

## SEQUENCE LISTING

<110> Lacour, Thierry  
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 Maier, Frank  
 Malz, Sascha

<120> Plasmid vectors for transformation of filamentous fungi

<130> 12810-00142-US

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 <141> 2004-12-23

<150> PCT/EP2003/007028  
 <151> 2003-07-02

<150> EP 02015067.8  
 <151> 2002-07-05

<150> EP 03008444.6  
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gag atc ggt ctc ggt ctt gac gtt ctt tcg gac gat gaa ctc gac ttt	5088



Glu Ile Gly Leu Gly	Leu Asp Val Leu Ser Asp Asp Glu Leu Asp Phe	
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gcg gac cac ggt gtc gac tca ctc ctc tca ttg acc atc act ggt cgc	5136	
Ala Asp His Gly Val Asp Ser Leu Leu Ser Leu Thr Ile Thr Gly Arg		
1700	1705	1710
atg cgt gag gaa ttg ggt ctc gac gtt gaa tct aca gca ttc atg aac	5184	
Met Arg Glu Glu Leu Gly Leu Asp Val Glu Ser Thr Ala Phe Met Asn		
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tgt ccc act ttg ggc agc ttt aaa ttg ttc cta gga ctt gtc gat cag	5232	
Cys Pro Thr Leu Gly Ser Phe Lys Leu Phe Leu Gly Leu Val Asp Gln		
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gac aat aag ggc agc agc ggc agt gat ggc agt ggt agg agc agt cca	5280	
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Ala Pro Gly Thr Glu Ser Gly Ala Thr Thr Pro Pro Met Ser Glu Glu		
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Asp Gln Asp Lys Ile Val Ser Ser His Ser Leu His Gln Phe Gln Ala		
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Ser Ser Thr Leu Leu Gln Gly Ser Pro Ser Lys Ala Arg Ser Thr Leu		
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ttc ttg cta cca gat ggc tcg gga tct gcc aca tcc tac gct tcc ctt	5472	
Phe Leu Leu Pro Asp Gly Ser Gly Ser Ala Thr Ser Tyr Ala Ser Leu		
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Pro Pro Ile Ser Pro Asp Gly Asp Val Ala Val Tyr Gly Leu Asn Cys		
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Pro Trp Leu Lys Asp Ser Ser Tyr Leu Val Glu Phe Gly Leu Lys Gly		
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Leu Thr Glu Leu Tyr Val Asn Glu Ile Leu Arg Arg Lys Pro Gln Gly		
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cct tac aat ttg gga gga tgg tca gcc ggt ggc att tgc gct tat gaa	5664	
Pro Tyr Asn Leu Gly Gly Trp Ser Ala Gly Gly Ile Cys Ala Tyr Glu		
1875	1880	1885
gct gcc ctg atc ctc acc aga gca gga cac caa gtc gat cgc ctt atc	5712	
Ala Ala Leu Ile Leu Thr Arg Ala Gly His Gln Val Asp Arg Leu Ile		
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Leu Ile Asp Ser Pro Asn Pro Val Gly Leu Glu Lys Leu Pro Pro Arg		

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Leu Tyr Asp Phe Leu Asn Ser Gln Asn Val Phe Gly Ser Asp Asn Pro				
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cac agc act gct gga aca agc gtc aaa gct cca gaa tgg ctt ctt gca				5856
His Ser Thr Ala Gly Thr Ser Val Lys Ala Pro Glu Trp Leu Leu Ala				
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His Phe Leu Ala Phe Ile Asp Ala Leu Asp Ala Tyr Val Ala Val Pro				
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tgg gac tct ggt cta gtc ggt cta gca tca ccg ctc cct gca ccg ccg				5952
Trp Asp Ser Gly Leu Val Gly Leu Ala Ser Pro Leu Pro Ala Pro Pro				
	1970	1975	1980	
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Gln Thr Tyr Met Leu Trp Ala Glu Asp Gly Val Cys Lys Asp Ser Asp				
	1985	1990	2000	
agt gct cgt ccc gag tac cgt gac gat gac cca cgc gag atg aga tgg				6048
Ser Ala Arg Pro Glu Tyr Arg Asp Asp Asp Pro Arg Glu Met Arg Trp				
	2005	2010	2015	
ctg ttg gag aac aga aca aac ttt ggt ccg aat ggt tgg gag gcg cta				6096
Leu Leu Glu Asn Arg Thr Asn Phe Gly Pro Asn Gly Trp Glu Ala Leu				
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Leu Gly Gly Lys Glu Gly Leu Phe Met Asp Arg Ile Ala Glu Ala Asn				
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His Phe Ser Met Leu Lys Arg Gly Arg Asn Ala Glu Tyr Val Ser Ala				
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 Val Ala Leu His Val Gly Leu Arg Val Trp Arg Thr Thr Ser Leu Phe  
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 645 650 655

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 Met Ser Tyr Asp Ser Ile Ala Gln Ala Gln Gly Phe Pro Ser Ile Leu  
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Pro Pro Ile Ser Pro Asp Gly Asp Val Ala Val Tyr Gly Leu Asn Cys  
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Pro Trp Leu Lys Asp Ser Ser Tyr Leu Val Glu Phe Gly Leu Lys Gly  
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Leu Thr Glu Leu Tyr Val Asn Glu Ile Leu Arg Arg Lys Pro Gln Gly  
 1860 1865 1870



Pro Tyr Asn Leu Gly Gly Trp Ser Ala Gly Gly Ile Cys Ala Tyr Glu  
 1875 1880 1885

Ala Ala Leu Ile Leu Thr Arg Ala Gly His Gln Val Asp Arg Leu Ile  
 1890 1895 1900

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 1905 1910 1915 1920

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 1925 1930 1935

His Ser Thr Ala Gly Thr Ser Val Lys Ala Pro Glu Trp Leu Leu Ala  
 1940 1945 1950

His Phe Leu Ala Phe Ile Asp Ala Leu Asp Ala Tyr Val Ala Val Pro  
 1955 1960 1965

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 2005 2010 2015

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Phe	Leu	Glu	Arg	Ala	Gly	Glu	Ala	Val	Arg	Phe	Glu	Asn	Gln	Asn	Arg	35	40	45	
Ser	His	Pro	Ser	Lys	Ala	Val	Pro	Asn	Phe	Ser	Thr	Ile	Gln	Glu	Leu	50	55	60	
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His	Ala	Ser	His	Xaa	His	Ser	Gln	Ser	Asp	Leu	Asp	Lys	Ile	Leu	Arg	245	250	255	
Pro	Gln	Thr	Lys	Thr	Ile	Phe	Gly	Asn	Thr	Thr	Val	Arg	Phe	Pro	Val	260	265	270	

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 Arg Cys Gln Arg Gly Thr His Ala Met Leu Ala Val Lys Ala Thr Pro  
 1025 1030 1035 1040  
 Glu Ala Leu Ser Gln Trp Ile Gln Asp His Asp Cys Glu Val Ala Cys  
 1045 1050 1055  
 Ile Asn Gly Pro Glu Asp Thr Val Leu Ser Gly Thr Thr Lys Asn Val  
 1060 1065 1070  
 Ala Glu Val Gln Arg Ala Met Thr Asp Asn Gly Ile Lys Cys Thr Leu  
 1075 1080 1085



Leu Lys Leu Pro Phe Ala Phe His Ser Ala Gln Val Gln Pro Ile Leu  
 1090 1095 1100

Asp Asp Phe Glu Ala Leu Ala Gln Gly Ala Thr Phe Ala Lys Pro Gln  
 1105 1110 1115 1120

Leu Leu Ile Leu Ser Pro Leu Leu Arg Thr Glu Ile His Glu Gln Gly  
 1125 1130 1135

Val Val Thr Pro Ser Tyr Val Ala Gln His Cys Arg His Thr Val Asp  
 1140 1145 1150

Met Ala Gln Ala Leu Arg Ser Ala Arg Glu Lys Gly Leu Ile Asp Asp  
 1155 1160 1165

Lys Thr Leu Val Ile Glu Leu Gly Pro Lys Pro Leu Ile Ser Gly Met  
 1170 1175 1180

Val Lys Met Thr Leu Gly Asp Lys Ile Ser Thr Leu Pro Thr Leu Ala  
 1185 1190 1195 1200

Pro Asn Lys Ala Ile Trp Pro Ser Leu Gln Lys Ile Leu Thr Ser Val  
 1205 1210 1215

Tyr Thr Gly Gly Trp Asp Ile Asn Trp Lys Lys Tyr His Ala Pro Phe  
 1220 1225 1230

Ala Ser Ser Gln Lys Val Val Asp Leu Pro Ser Tyr Gly Trp Asp Leu  
 1235 1240 1245

Lys Asp Tyr Tyr Ile Pro Tyr Gln Gly Asp Trp Cys Leu His Arg His  
 1250 1255 1260

Gln Gln Asp Cys Lys Cys Ala Ala Pro Gly His Glu Ile Lys Thr Ala  
 1265 1270 1275 1280

Asp Tyr Gln Val Pro Pro Glu Ser Thr Pro His Arg Pro Ser Lys Leu  
 1285 1290 1295

Asp Pro Ser Lys Glu Ala Phe Pro Glu Ile Lys Thr Thr Thr Thr Leu  
 1300 1305 1310

His Arg Val Val Glu Glu Thr Thr Lys Pro Leu Gly Ala Thr Leu Val  
 1315 1320 1325

Val Glu Thr Asp Ile Ser Arg Lys Asp Val Asn Gly Leu Ala Arg Gly  
 1330 1335 1340

His Leu Val Asp Gly Ile Pro Leu Cys Thr Pro Ser Phe Tyr Ala Asp  
 1345 1350 1355 1360

Ile Ala Met Gln Val Gly Gln Tyr Ser Met Gln Arg Leu Arg Ala Gly  
 1365 1370 1375

His Pro Gly Ala Gly Ala Ile Asp Gly Leu Val Asp Val Ser Asp Met  
 1380 1385 1390

Val Val Asp Lys Ala Leu Val Pro His Gly Lys Gly Pro Gln Leu Leu  
 1395 1400 1405  
 Arg Thr Thr Leu Thr Met Glu Trp Pro Pro Lys Ala Ala Ala Thr Thr  
 1410 1415 1420  
 Arg Ser Ala Lys Val Lys Phe Ala Thr Tyr Phe Ala Asp Gly Lys Leu  
 1425 1430 1435 1440  
 Asp Thr Glu His Ala Ser Cys Thr Val Arg Phe Thr Ser Asp Ala Gln  
 1445 1450 1455  
 Leu Lys Ser Leu Arg Arg Ser Val Ser Glu Tyr Lys Thr His Ile Arg  
 1460 1465 1470  
 Gln Leu His Asp Gly His Ala Lys Gly Gln Phe Met Arg Tyr Asn Arg  
 1475 1480 1485  
 Lys Thr Gly Tyr Lys Leu Met Ser Ser Met Ala Arg Phe Asn Pro Asp  
 1490 1495 1500  
 Tyr Met Leu Leu Asp Tyr Leu Val Leu Asn Glu Ala Glu Asn Glu Ala  
 1505 1510 1515 1520  
 Ala Ser Gly Val Asp Phe Ser Leu Gly Ser Ser Glu Gly Thr Phe Ala  
 1525 1530 1535  
 Ala His Pro Ala His Val Asp Ala Ile Thr Gln Val Ala Gly Phe Ala  
 1540 1545 1550  
 Met Asn Ala Asn Asp Asn Val Asp Ile Glu Lys Gln Val Tyr Val Asn  
 1555 1560 1565  
 His Gly Trp Asp Ser Phe Gln Ile Tyr Gln Pro Leu Asp Asn Ser Lys  
 1570 1575 1580  
 Ser Tyr Gln Val Tyr Thr Lys Met Gly Gln Ala Lys Glu Asn Asp Leu  
 1585 1590 1595 1600  
 Val His Gly Asp Val Val Val Leu Asp Gly Glu Gln Ile Val Ala Phe  
 1605 1610 1615  
 Phe Arg Gly Leu Thr Leu Arg Ser Val Pro Arg Gly Ala Leu Arg Val  
 1620 1625 1630  
 Val Leu Gln Thr Thr Val Lys Lys Ala Asp Arg Gln Leu Gly Phe Lys  
 1635 1640 1645  
 Thr Met Pro Ser Pro Pro Pro Pro Thr Thr Thr Met Pro Ile Ser Pro  
 1650 1655 1660  
 Tyr Lys Pro Ala Asn Thr Gln Val Ser Ser Gln Ala Ile Pro Ala Glu  
 1665 1670 1675 1680  
 Ala Thr His Ser His Thr Pro Pro Gln Pro Lys His Ser Pro Val Pro  
 1685 1690 1695

Glu Thr Ala Gly Ser Ala Pro Ala Ala Lys Gly Val Gly Val Ser Asn  
 1700 1705 1710

Glu Lys Leu Asp Ala Val Met Arg Val Val Ser Glu Glu Ser Gly Ile  
 1715 1720 1725

Ala Leu Glu Glu Leu Thr Asp Asp Ser Asn Phe Ala Asp Met Gly Ile  
 1730 1735 1740

Asp Ser Leu Ser Ser Met Val Ile Gly Ser Arg Phe Arg Glu Asp Leu  
 1745 1750 1755 1760

Gly Leu Asp Leu Gly Pro Glu Phe Ser Leu Phe Ile Asp Cys Thr Thr  
 1765 1770 1775

Val Arg Ala Leu Lys Asp Phe Met Leu Gly Ser Gly Asp Ala Gly Ser  
 1780 1785 1790

Gly Ser Asn Val Glu Asp Pro Pro Pro Ser Ala Thr Pro Gly Ile Asn  
 1795 1800 1805

Pro Glu Thr Asp Trp Ser Ser Ser Ala Ser Asp Ser Ile Phe Ala Ser  
 1810 1815 1820

Glu Asp His Gly His Ser Ser Glu Ser Gly Ala Asp Thr Gly Ser Pro  
 1825 1830 1835 1840

Pro Ala Leu Asp Leu Lys Pro Tyr Cys Arg Pro Ser Thr Ser Val Val  
 1845 1850 1855

Leu Gln Gly Leu Pro Met Val Ala Arg Lys Thr Leu Phe Met Leu Pro  
 1860 1865 1870

Asp Gly Gly Gly Ser Ala Phe Ser Tyr Ala Ser Leu Pro Arg Leu Lys  
 1875 1880 1885

Ser Asp Thr Ala Val Val Gly Leu Asn Cys Pro Tyr Ala Arg Asp Pro  
 1890 1895 1900

Glu Asn Met Asn Cys Thr His Gly Ala Met Ile Glu Ser Phe Cys Asn  
 1905 1910 1915 1920

Glu Ile Arg Arg Arg Gln Pro Arg Gly Pro Tyr His Leu Gly Gly Trp  
 1925 1930 1935

Ser Ser Gly Gly Ala Phe Ala Tyr Val Val Ala Glu Ala Leu Val Asn  
 1940 1945 1950

Gln Gly Glu Glu Val His Ser Leu Ile Ile Ile Asp Ala Pro Ile Pro  
 1955 1960 1965

Gln Ala Met Glu Gln Leu Pro Arg Ala Phe Tyr Glu His Cys Asn Ser  
 1970 1975 1980

Ile Gly Leu Phe Ala Thr Gln Pro Gly Ala Ser Pro Asp Gly Ser Thr  
 1985 1990 1995 2000

Val Ala Leu Arg Leu Gly Leu Cys Val Tyr Arg Val Arg Lys Leu Phe

145		150		155		160
Gly Gln Asp Gln Ala Ala Pro Leu Ser Trp Ser Ala Leu Val Ser Gly						
		165		170		175
Leu Ser Glu Ser Glu Gly Thr Ser Leu Ile Asp Lys Phe Thr Arg Arg						
		180		185		190
Asn Val Ile Pro Pro Ser Ser Arg Pro Tyr Ile Ser Ala Val Cys Ala						
		195		200		205
Asn Thr Leu Thr Ile Ser Gly Pro Pro Val Val Leu Asn Gln Phe Leu						
		210		215		220
Asp Thr Phe Ile Ser Gly Lys Asn Lys Ala Val Met Val Pro Ile His						
		225		230		235
Gly Pro Phe His Ala Ser His Leu Tyr Glu Lys Arg Asp Val Glu Trp						
		245		250		255
Ile Leu Lys Ser Cys Asn Val Glu Thr Ile Arg Asn His Lys Pro Arg						
		260		265		270
Ile Pro Val Leu Ser Ser Asn Thr Gly Glu Leu Ile Val Val Glu Asn						
		275		280		285
Met Glu Gly Phe Leu Lys Ile Ala Leu Glu Glu Ile Leu Leu Arg Gln						
		290		295		300
Met Ser Trp Asp Lys Val Thr Asp Ser Cys Ile Ser Ile Leu Lys Ser						
		305		310		315
Val Gly Asp Asn Lys Pro Lys Lys Leu Leu Pro Ile Ser Ser Thr Ala						
		325		330		335
Thr Gln Ser Leu Phe Asn Ser Leu Lys Lys Ser Asn Leu Val Asn Ile						
		340		345		350
Glu Val Asp Gly Gly Ile Ser Asp Phe Ala Ala Glu Thr Gln Leu Val						
		355		360		365
Asn Gln Thr Gly Arg Ala Glu Leu Ser Lys Ile Ala Ile Ile Gly Met						
		370		375		380
Ser Gly Arg Phe Pro Glu Ala Asp Ser Pro Gln Asp Phe Trp Asn Leu						
		385		390		395
Leu Tyr Lys Gly Leu Asp Val His Arg Lys Val Pro Glu Asp Arg Trp						
		405		410		415
Asp Ala Asp Ala His Val Asp Leu Thr Gly Thr Ala Thr Asn Thr Ser						
		420		425		430
Lys Val Pro Tyr Gly Cys Trp Ile Arg Glu Pro Gly Leu Phe Asp Pro						
		435		440		445
Arg Phe Phe Asn Met Ser Pro Arg Glu Ala Leu Gln Ala Asp Pro Ala						

450		455		460
Gln Arg Leu Ala Leu Leu Thr Ala Tyr Glu Ala Leu Glu Gly Ala Gly				
465		470		480
Phe Val Pro Asp Ser Thr Pro Ser Thr Gln Arg Asp Arg Val Gly Ile				
	485		490	495
Phe Tyr Gly Met Thr Ser Asp Asp Tyr Arg Glu Val Asn Ser Gly Gln				
	500		505	510
Asp Ile Asp Thr Tyr Phe Ile Pro Gly Gly Asn Arg Ala Phe Thr Pro				
	515		520	525
Gly Arg Ile Asn Tyr Tyr Phe Lys Phe Ser Gly Pro Ser Val Ser Val				
	530		535	540
Asp Thr Ala Cys Ser Ser Ser Leu Ala Ala Ile His Leu Ala Cys Asn				
	545		550	560
Ser Ile Trp Arg Asn Asp Cys Asp Thr Ala Ile Thr Gly Gly Val Asn				
	565		570	575
Ile Leu Thr Asn Pro Asp Asn His Ala Gly Leu Asp Arg Gly His Phe				
	580		585	590
Leu Ser Arg Thr Gly Asn Cys Asn Thr Phe Asp Asp Gly Ala Asp Gly				
	595		600	605
Tyr Cys Arg Ala Asp Gly Val Gly Thr Val Val Leu Lys Arg Leu Glu				
	610		615	620
Asp Ala Leu Ala Asp Asn Asp Pro Ile Leu Gly Val Ile Asn Gly Ala				
	625		630	640
Tyr Thr Asn His Ser Ala Glu Ala Val Ser Ile Thr Arg Pro His Val				
	645		650	655
Gly Ala Gln Ala Phe Ile Phe Lys Lys Leu Leu Asn Glu Ala Asn Val				
	660		665	670
Asp Pro Lys Asn Ile Ser Tyr Ile Glu Met His Gly Thr Gly Thr Gln				
	675		680	685
Ala Gly Asp Ala Val Glu Met Gln Ser Val Leu Asp Val Phe Ala Pro				
	690		695	700
Asp His Arg Arg Gly Pro Gly Gln Ser Leu His Leu Gly Ser Ala Lys				
	705		710	715
Ser Asn Ile Gly His Gly Glu Ser Ala Ser Gly Val Thr Ser Leu Val				
	725		730	735
Lys Val Leu Leu Met Met Lys Glu Asn Met Ile Pro Pro His Cys Gly				
	740		745	750
Ile Lys Thr Lys Ile Asn His Asn Phe Pro Thr Asp Leu Ala Gln Arg				

755	760	765
Asn Val His Ile Ala Leu Gln Pro Thr Ala Trp Asn Arg Pro Ser Phe 770 775 780		
Gly Lys Arg Gln Ile Phe Leu Asn Asn Phe Ser Ala Ala Gly Gly Asn 785 790 795 800		
Thr Ala Leu Leu Leu Glu Asp Gly Pro Val Ser Asp Pro Glu Gly Glu 805 810 815		
Asp Lys Arg Arg Thr His Val Ile Thr Leu Ser Ala Arg Ser Gln Thr 820 825 830		
Ala Leu Gln Asn Asn Ile Asp Ala Leu Cys Gln Tyr Ile Ser Glu Gln 835 840 845		
Glu Lys Thr Phe Gly Val Lys Asp Ser Asn Ala Leu Pro Ser Leu Ala 850 855 860		
Tyr Thr Thr Thr Ala Arg Arg Ile His His Pro Phe Arg Val Thr Ala 865 870 875 880		
Ile Gly Ser Ser Phe Gln Glu Met Arg Asp Ser Leu Ile Ala Ser Ser 885 890 895		
Arg Lys Glu Phe Val Ala Val Pro Ala Lys Thr Pro Gly Ile Gly Phe 900 905 910		
Leu Phe Thr Gly Gln Gly Ala Gln Tyr Ala Ala Met Gly Lys Gln Leu 915 920 925		
Tyr Glu Asp Cys Ser His Phe Arg Ser Ala Ile Glu His Leu Asp Cys 930 935 940		
Ile Ser Gln Gly Gln Asp Leu Pro Ser Ile Leu Pro Leu Val Asp Gly 945 950 955 960		
Ser Leu Pro Leu Ser Glu Leu Ser Pro Val Val Val Gln Leu Gly Thr 965 970 975		
Thr Cys Val Gln Met Ala Leu Ser Ser Phe Trp Ala Ser Leu Gly Ile 980 985 990		
Thr Pro Ser Phe Val Leu Gly His Ser Leu Gly Asp Phe Ala Ala Met 995 1000 1005		
Asn Ala Ala Gly Val Leu Ser Thr Ser Asp Thr Ile Tyr Ala Cys Gly 1010 1015 1020		
Arg Arg Ala Gln Leu Leu Thr Glu Arg Cys Gln Pro Gly Thr His Ala 1025 1030 1035 1040		
Met Leu Ala Ile Lys Ala Pro Leu Val Glu Val Lys Gln Leu Leu Asn 1045 1050 1055		
Glu Lys Val His Asp Met Ala Cys Ile Asn Ser Pro Ser Glu Thr Val		

1060	1065	1070
Ile Ser Gly Pro Lys Ser Ser Ile Asp Glu Leu Ser Arg Ala Cys Ser 1075	1080	1085
Glu Lys Gly Leu Lys Ser Thr Ile Leu Thr Val Pro Tyr Ala Phe His 1090	1095	1100
Ser Ala Gln Val Glu Pro Ile Leu Glu Asp Leu Glu Lys Ala Leu Gln 1105	1110	1115 1120
Gly Ile Thr Phe Asn Lys Pro Ser Val Pro Phe Val Ser Ala Leu Leu 1125	1130	1135
Gly Glu Val Ile Thr Glu Ala Gly Ser Asn Ile Leu Asn Ala Glu Tyr 1140	1145	1150
Leu Val Arg His Cys Arg Glu Thr Val Asn Phe Leu Ser Ala Phe Glu 1155	1160	1165
Ala Val Arg Asn Ala Lys Leu Gly Gly Asp Gln Thr Leu Trp Leu Glu 1170	1175	1180
Val Gly Pro His Thr Val Cys Ser Gly Met Val Lys Ala Thr Leu Gly 1185	1190	1195 1200
Pro Gln Thr Thr Thr Met Ala Ser Leu Arg Arg Asp Glu Asp Thr Trp 1205	1210	1215
Lys Val Leu Ser Asn Ser Leu Ser Ser Leu Tyr Leu Ala Gly Val Asp 1220	1225	1230
Ile Asn Trp Lys Gln Tyr His Gln Asp Phe Ser Ser Ser His Arg Val 1235	1240	1245
Leu Pro Leu Pro Thr Tyr Lys Trp Asp Leu Lys Asn Tyr Trp Ile Pro 1250	1255	1260
Tyr Arg Asn Asn Phe Cys Leu Thr Lys Gly Ser Ser Met Ser Ala Ala 1265	1270	1275 1280
Ser Ala Ser Leu Gln Pro Thr Phe Leu Thr Thr Ser Ala Gln Arg Val 1285	1290	1295
Val Glu Ser Arg Asp Asp Gly Leu Thr Ala Thr Val Val Val His Asn 1300	1305	1310
Asp Ile Ala Asp Pro Asp Leu Asn Arg Val Ile Gln Gly His Lys Val 1315	1320	1325
Asn Gly Ala Ala Leu Cys Pro Ser Ser Leu Tyr Ala Asp Ser Ala Gln 1330	1335	1340
Thr Leu Ala Glu Tyr Leu Ile Glu Lys Tyr Lys Pro Glu Leu Lys Gly 1345	1350	1355 1360
Ser Gly Leu Asp Val Cys Asn Val Thr Val Pro Lys Pro Leu Ile Ala		



1365

1370

1375

Lys Thr Gly Lys Glu Gln Phe Arg Ile Ser Ala Thr Ala Asn Trp Val  
 1380 1385 1390

Asp Lys His Val Ser Val Gln Val Phe Ser Val Thr Ala Glu Gly Lys  
 1395 1400 1405

Lys Leu Ile Asp His Ala His Cys Glu Val Lys Leu Phe Asp Cys Met  
 1410 1415 1420

Ala Ala Asp Leu Glu Trp Lys Arg Gly Ser Tyr Leu Val Lys Arg Ser  
 1425 1430 1435 1440

Ile Glu Leu Leu Glu Asn Ser Ala Val Lys Gly Asp Ala His Arg Leu  
 1445 1450 1455

Arg Arg Gly Met Val Tyr Lys Leu Phe Ser Ala Leu Val Asp Tyr Asp  
 1460 1465 1470

Glu Asn Tyr Gln Ser Ile Arg Glu Val Ile Leu Asp Ser Glu His His  
 1475 1480 1485

Glu Ala Thr Ala Leu Val Lys Phe Gln Ala Pro Gln Ala Asn Phe His  
 1490 1495 1500

Arg Asn Pro Tyr Trp Ile Asp Ser Phe Gly His Leu Ser Gly Phe Ile  
 1505 1510 1515 1520

Met Asn Ala Ser Asp Gly Thr Asp Ser Lys Ser Gln Val Phe Val Asn  
 1525 1530 1535

His Gly Trp Asp Ser Met Arg Cys Leu Lys Lys Phe Ser Ala Asp Val  
 1540 1545 1550

Thr Tyr Arg Thr Tyr Val Arg Met Gln Pro Trp Arg Asp Ser Ile Trp  
 1555 1560 1565

Ala Gly Asn Val Tyr Ile Phe Glu Gly Asp Asp Ile Ile Ala Val Phe  
 1570 1575 1580

Gly Gly Val Lys Phe Gln Ala Leu Ser Arg Lys Ile Leu Asp Ile Ala  
 1585 1590 1595 1600

Leu Pro Pro Ala Gly Leu Ser Lys Ala Gln Thr Ser Pro Ile Gln Ser  
 1605 1610 1615

Ser Ala Pro Gln Lys Pro Ile Glu Thr Ala Lys Pro Thr Ser Arg Pro  
 1620 1625 1630

Ala Pro Pro Val Thr Met Lys Ser Phe Val Lys Lys Ser Ala Gly Pro  
 1635 1640 1645

Ser Val Val Val Arg Ala Leu Asn Ile Leu Ala Ser Glu Val Gly Leu  
 1650 1655 1660

Ser Glu Ser Asp Met Ser Asp Asp Leu Val Phe Ala Asp Tyr Gly Val

1665	1670	1675	1680
Asp Ser Leu Leu Ser Leu Thr Val Thr Gly Lys Tyr Arg Glu Glu Leu			
1685	1690	1695	
Asn Leu Asp Met Asp Ser Ser Val Phe Ile Glu His Pro Thr Val Gly			
1700	1705	1710	
Asp Phe Lys Arg Phe Val Thr Gln Leu Ser Pro Ser Val Ala Ser Asp			
1715	1720	1725	
Ser Ser Ser Thr Asp Arg Glu Ser Glu Tyr Ser Phe Asn Gly Asp Ser			
1730	1735	1740	
Cys Ser Gly Leu Ser Ser Pro Ala Ser Pro Gly Thr Val Ser Pro Pro			
1745	1750	1755	1760
Asn Glu Lys Val Ile Gln Ile His Glu Asn Gly Thr Met Lys Glu Ile			
1765	1770	1775	
Arg Ala Ile Ile Ala Asp Glu Ile Gly Val Ser Ala Asp Glu Ile Lys			
1780	1785	1790	
Ser Asp Glu Asn Leu Asn Glu Leu Gly Met Asp Ser Leu Leu Ser Leu			
1795	1800	1805	
Thr Val Leu Gly Lys Ile Arg Glu Ser Leu Asp Met Asp Leu Pro Gly			
1810	1815	1820	
Glu Phe Phe Ile Glu Asn Gln Thr Leu Asp Gln Ile Glu Thr Ala Leu			
1825	1830	1835	1840
Asp Leu Lys Pro Lys Ala Val Pro Thr Ala Val Pro Gln Ser Gln Pro			
1845	1850	1855	
Ile Thr Leu Pro Gln Ser Gln Ser Thr Lys Gln Leu Ser Thr Arg Pro			
1860	1865	1870	
Thr Ser Ser Ser Asp Asn His Pro Pro Ala Thr Ser Ile Leu Leu Gln			
1875	1880	1885	
Gly Asn Pro Arg Thr Ala Ser Lys Thr Leu Phe Leu Phe Pro Asp Gly			
1890	1895	1900	
Ser Gly Ser Ala Thr Ser Tyr Ala Thr Ile Pro Gly Val Ser Pro Asn			
1905	1910	1915	1920
Val Ala Val Tyr Gly Leu Asn Cys Pro Tyr Met Lys Ala Pro Glu Lys			
1925	1930	1935	
Leu Thr Cys Ser Leu Asp Ser Leu Thr Thr Pro Tyr Leu Ala Glu Ile			
1940	1945	1950	
Arg Arg Arg Gln Pro Thr Gly Pro Tyr Asn Leu Gly Gly Trp Ser Gln			
1955	1960	1965	
Ala Gly Ser Ala His Thr Thr Arg His Ala Ser Ser Tyr Cys Ser Arg			

1970

1975

1980

Ala Lys  
1985

<210> 14  
<211> 53  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: Primer

<400> 14  
atgaagcttg gggtttgagg gccaatggaa cgaaactagt gtaccacttg acc 53

<210> 15  
<211> 28  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: Primer

<400> 15  
gacagatctg gcgccattcg ccattcag 28

<210> 16  
<211> 20  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: Primer

<400> 16  
ggaatcggtc aatacactac 20

<210> 17  
<211> 33  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: Primer

<400> 17  
tgtagatctc tattcctttg ccctcggacg agt 33

<210> 18  
<211> 35  
<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Primer

<400> 18

ggccgccacg gatattcttg ccaaagaatt cctgg

35

<210> 19

<211> 35

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Primer

<400> 19

cggcgcctat agaaccggtt tcttaaggac cgcgc

35

<210> 20

<211> 19

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Primer

<400> 20

gayccmgtty ttyaayatg

19

<210> 21

<211> 17

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Primer

<400> 21

gtccgtccrt gcatytc

17

<210> 22

<211> 34

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Primer

<400> 22

ataagaatgc ggccgcaatg gccctcgaaa cagc

34

<210> 23  
 <211> 29  
 <212> DNA  
 <213> Artificial Sequence

<220>  
 <223> Description of Artificial Sequence: Primer

<400> 23  
 aaatggcgcg ccgccccag aatgacacc 29

<210> 24  
 <211> 23  
 <212> DNA  
 <213> Artificial Sequence

<220>  
 <223> Description of Artificial Sequence: Primer

<400> 24  
 tgccacctgt agtctgcaat cag 23

<210> 25  
 <211> 24  
 <212> DNA  
 <213> Artificial Sequence

<220>  
 <223> Description of Artificial Sequence: Primer

<400> 25  
 tgactaaccg tgacaacttc gctg 24

<210> 26  
 <211> 19  
 <212> DNA  
 <213> Artificial Sequence

<220>  
 <223> Description of Artificial Sequence: Primer

<400> 26  
 ccaggatccg actgctcag 19

<210> 27  
 <211> 21  
 <212> DNA  
 <213> Artificial Sequence

<220>  
 <223> Description of Artificial Sequence: Primer

<400> 27

ctacatcgag atgcacggca c

21

<210> 28  
 <211> 16  
 <212> DNA  
 <213> Artificial Sequence  
 <220>  
 <223> Description of Artificial Sequence: Primer  
 <220>  
 <221> misc\_feature  
 <222> (1)..(1)  
 <223> n is a, c, g, t, unknown, or other  
 <220>  
 <221> misc\_feature  
 <222> (11)..(11)  
 <223> n is a, c, g, t, unknown, or other

<400> 28  
 ngtcgaswga nawgaa

16

<210> 29  
 <211> 16  
 <212> DNA  
 <213> Artificial Sequence  
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 <223> Description of Artificial Sequence: Primer  
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 <221> misc\_feature  
 <222> (3)..(3)  
 <223> n is a, c, g, t, unknown, or other  
 <220>  
 <221> misc\_feature  
 <222> (11)..(11)  
 <223> n is a, c, g, t, unknown, or other

<400> 29  
 gtncgaswca nawgtt

16

<210> 30  
 <211> 16  
 <212> DNA  
 <213> Artificial Sequence  
 <220>  
 <223> Description of Artificial Sequence: Primer  
 <220>  
 <221> misc\_feature

<222> (5)..(5)  
 <223> n is a, c, g, t, unknown, or other

<220>  
 <221> misc\_feature  
 <222> (10)..(10)  
 <223> n is a, c, g, t, unknown, or other

<220>  
 <221> misc\_feature  
 <222> (13)..(13)  
 <223> n is a, c, g, t, unknown, or other

<400> 30  
 wgtgnagwan canaga

16

<210> 31  
 <211> 15  
 <212> DNA  
 <213> Artificial Sequence

<220>  
 <223> Description of Artificial Sequence: Primer

<220>  
 <221> misc\_feature  
 <222> (1)..(1)  
 <223> n is a, c, g, t, unknown, or other

<400> 31  
 ntcgastwts gwggtt

15

<210> 32  
 <211> 16  
 <212> DNA  
 <213> Artificial Sequence

<220>  
 <223> Description of Artificial Sequence: Primer

<220>  
 <221> misc\_feature  
 <222> (5)..(5)  
 <223> n is a, c, g, t, unknown, or other

<220>  
 <221> misc\_feature  
 <222> (10)..(10)  
 <223> n is a, c, g, t, unknown, or other

<400> 32  
 tgwnagwan casaga

16

<210> 33

<211> 16  
 <212> DNA  
 <213> Artificial Sequence

<220>  
 <223> Description of Artificial Sequence: Primer

<220>  
 <221> misc\_feature  
 <222> (5)..(5)  
 <223> n is a, c, g, t, unknown, or other

<220>  
 <221> misc\_feature  
 <222> (10)..(10)  
 <223> n is a, c, g, t, unknown, or other

<400> 33  
 agwgnagwan cawagg

16

<210> 34  
 <211> 14  
 <212> DNA  
 <213> Artificial Sequence

<220>  
 <223> Description of Artificial Sequence: Primer

<220>  
 <221> misc\_feature  
 <222> (7)..(7)  
 <223> n is a, c, g, t, unknown, or other

<400> 34  
 cawcgngaa sgaa

14

<210> 35  
 <211> 14  
 <212> DNA  
 <213> Artificial Sequence

<220>  
 <223> Description of Artificial Sequence: Primer

<220>  
 <221> misc\_feature  
 <222> (7)..(7)  
 <223> n is a, c, g, t, unknown, or other

<400> 35  
 tcstcgnact wgga

14

<210> 36  
 <211> 23



<212> DNA  
 <213> Artificial Sequence

<220>  
 <223> Description of Artificial Sequence: Primer

<400> 36  
 ttgttactgg agaggtaatg aag 23

<210> 37  
 <211> 23  
 <212> DNA  
 <213> Artificial Sequence

<220>  
 <223> Description of Artificial Sequence: Primer

<400> 37  
 tgagacagat ctcgcgagcc ctc 23

<210> 38  
 <211> 22  
 <212> DNA  
 <213> Artificial Sequence

<220>  
 <223> Description of Artificial Sequence: Primer

<400> 38  
 atgtctccaa aggaagctga gc 22

<210> 39  
 <211> 22  
 <212> DNA  
 <213> Artificial Sequence

<220>  
 <223> Description of Artificial Sequence: Primer

<400> 39  
 tcgagtgatg gatactgctt cg 22

<210> 40  
 <211> 29  
 <212> DNA  
 <213> Artificial Sequence

<220>  
 <223> Description of Artificial Sequence: Primer

<400> 40  
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<220>  
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<223> Description of Artificial Sequence: Primer

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